

Fresh Water sediment quality Criteria
Approach.

A. Water Quality Criteria

1. derived from toxicological data from sediment-free bioassays on nektonic organisms
 - (a) assume that no increased body burden from contact with or ingestion of sediment.
 - (b) benthic organisms -
2. Rely on existing ^{top} water quality criteria to assess acceptable levels in interstitial waters.

B. Sediment-Water Equilibrium Partitioning Approach.

1. Exchange among sediment, interstitial water, overlying water.
2. Compound-specific partition coefficients. -

Bolton, H.S., R.J. Bodder, B.W. Vigor, J.A. Scanlon, S.L. Clark, May 10, 1985.
National Perspective on Sediment Quality.

Prepared for: U.S. EPA, Office of Criteria and Standards, by Battelle,
Washington Environmental Program Office, 2030 M. St. NW.
Washington, D.C. 20036 EPA Contract No. 68-01-6986.

Lymann, W.J., A.L. Glazer, J.H. Ong, S.F. Coons, Nov 1986.
An Overview of Sediment Quality in the United States, ~~U.S. EPA~~
Prepared for: Monitoring and Data Support Division, Office of Water
Regulation & Standards, U.S. EPA, Wash, DC.

EPA Contract # 68-01-6951



HARDNESS = 34.25 MG/L CaCO_3 AVERAGE.

WATER QUALITY CRITERIA FOR METALS IN FRESH WATER.

Cu } e $(.9422 [\ln(\text{HARDNESS})] - 1.464)$
e $(.9422 [\ln 34.25] - 1.464) = 6.46 \mu\text{g/L ACUTE (1HR)}$

Cu (ACUTE) e $(.8545 [\ln(\text{HARDNESS})] - 1.465) = 4.73 \mu\text{g/L CHRONIC (4 DAY -)}$

Pb } e $(1.273 [\ln(h)] - 1.460) = 20.87 \mu\text{g/L ACUTE.}$
e $(1.273 [\ln(h)] - 4.705) = 0.81 \mu\text{g/L CHRONIC.}$

Hg } $2.4 \mu\text{g/L ACUTE}$
 $.012 \mu\text{g/L CHRONIC.}$

Zn } e $(.8473 [\ln(h)] + .8604) = 47.20 \mu\text{g/L ACUTE.}$
e $(.8473 [\ln(h)] + .7614) = 42.75 \mu\text{g/L CHRONIC.}$

As^{III} $360 \mu\text{g/L - ACUTE}$
 $190 \mu\text{g/L CHRONIC}$

As^V $850 \mu\text{g/L LOEL}$
 $48 \mu\text{g/L LOEL.}$

Cd } e $(1.128 [\ln(h)] - 3.828) = 1.17 \mu\text{g/L ACUTE}$
e $(.7852 [\ln(h)] - 3.490) = 0.49 \mu\text{g/L CHRONIC.}$

Ni e $(.8460 [\ln(h)] + 3.3612) = 572.89 \mu\text{g/L ACUTE.}$
e $(.8460 [\ln(h)] + 1.1645) = 63.69 \mu\text{g/L CHRONIC}$

Cr^{VI} $16 \mu\text{g/L ACUTE}$
 $11 \mu\text{g/L CHRONIC.}$

Fe $1 \mu\text{g/L CHRONIC.}$

Water quality criteria for metals Albright, Marguia.

Marine Power. Significance of Elutriate metals analysis:

Arsenic exceeds the threshold value for sediment metal levels.

Cadmium exceeds the median concentration.

Copper exceeds threshold and maximum concentration found.

Iron - no worry.

Lead. exceeds threshold and 95th percentile concentration.

Zinc exceeds threshold and 95th percentile concentration.

National Perspective on Water Quality

Bolton et al.

Bolton, H.S., Bretler, R.J., Vigor, B.W., Scanlon, J.A. ^{and} Clark (S.D.)
1985. National Perspective on Sediment Quality. ^{Prep. for,} U.S. EPA.

Battelle Washington Environmental Program Office, Washington, DC. 20036. EPA. Contract No: 68-01-6986

Threshold values ^{derived} from the sediment-water partitioning approach are based on average of 4% total organic carbon.

Chronic values are selected.

If 1-2% TOC were used for sediment, more sites would have been noted as being above threshold concentrations.

Evaluation of Dredged Material Disposal Alternatives for U.S. Navy
Airport at Everett, Wa. - [A.C. & E.]

"The estimated release of contaminants in the dissolved form during dredging is negligible.

Estimated mass release was 2% for clamshell and 1% for hydraulic dredging (cutter head).

CAD Disposal.

Standard elutriate testing indicated that contaminant release in dissolved form during placement of the contaminated material was below reference water ~~contamination~~ concentration or criteria for most parameters.

Compare standard elutriate tests with background concentrations and water quality criteria. -

Contaminants will remain tightly bound to the sediment, so the most important element in evaluating a decision is settling velocity of entrained sediment. Elutriate tests as well as composite sediment and site water samples should be evaluated. -

Replicate analysis for samples.